

MARINE ENVIRONMENT PROTECTION
COMMITTEE
65th session
Agenda item 2

MEPC 65/INF.26
8 March 2013
ENGLISH ONLY

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Information on the renewal and update of the Type Approval for the Resource Ballast Technologies System (cavitation combined with ozone and sodium hypochlorite treatment)

Submitted by South Africa

SUMMARY

<i>Executive summary:</i>	This document provides a notification to the Organization of the renewal and updating of the Type Approval for the Resource Ballast Technologies System by the South African Administration
<i>Strategic direction:</i>	7.1 and 13
<i>High-level action:</i>	7.1.2 and 13.0.3
<i>Planned output:</i>	7.1.2.4 and 13.0.3.1
<i>Action to be taken:</i>	Paragraph 6
<i>Related documents:</i>	MEPC 56/2/3; MEPC 59/2/10; MEPC 60/22; MEPC 62/INF.18, and MEPC 62/24

Introduction

1 MEPC 62 noted with appreciation the information contained in MEPC 62/INF.18 informing of the Type Approval, granted by the South African Administration, to the Resource Ballast Technologies System, which makes use of cavitation combined with the Active Substances ozone and sodium hypochlorite.

2 The South African Administration has delegated the Type Approval of ballast water management systems under Guidelines (G8) to the South African Maritime Safety Authority (SAMSA) that has overseen the evaluation of the Resource Ballast Technologies System with respect to both Guidelines (G8) and Procedure (G9).

3 After taking into account the recommendations contained in the Report of the tenth meeting of the GESAMP-Ballast Water Working Group (MEPC 60/2/11, annex 7), and based on the extensive review process and comprehensive evaluations conducted under the authority of SAMSA, the South African Administration confirms that the system meets the

requirements of the *Guidelines for approval of ballast water management systems (G8)* and the *Procedure for approval of ballast water management systems that make use of Active Substances (G9)*.

4 On the basis of the above, as well as procedures leading to the issuing of the Type Approval Certificate on 19 April 2011, the South African Administration confirms that SAMSA has now reviewed the Type Approval Certificate and related documentation and issued a renewal of the Certificate containing some minor non-technical updated information. The new Type Approval Certificate, issued to the Resource Ballast Technologies System on behalf of the South African Administration, is presented in the annex of this document.

5 In accordance with resolution MEPC.175(58) "Information reporting on type-approved ballast water management systems", the following information is provided:

- .1 approval date: 18 January 2013;
- .2 name of the Administration: The South African Department of Transport;
- .3 name of the BWMS: Resource Ballast Technologies System; and
- .4 a copy of the Type Approval Certificate and a summary of the land-based and shipboard tests are presented in the annex of this document.

Action requested of the Committee

6 The Committee is invited to note the information contained in this document.

ANNEX

**TYPE APPROVAL CERTIFICATE OF RESOURCE BALLAST TECHNOLOGIES SYSTEM
ISSUED BY THE SOUTH AFRICAN MARITIME ADMINISTRATION**



Certificate No: EL 002

**TYPE APPROVAL CERTIFICATE OF BALLAST WATER
MANAGEMENT SYSTEM**

Issued by the South African Maritime Safety Authority (SAMS) under the authority of the South African Department of Transport

This is to certify that the Ballast Water Management Systems listed below have been examined and tested in accordance with the requirements of the specifications contained in the Guidelines contained in the IMO resolution MEPC.174(58). This certificate is valid only for the Ballast Water Management Systems referred to in this certificate.

Ballast Water Management System supplied by:	Resource Ballast Technologies (Pty.) Ltd.
Under type and model designation and incorporating:	Resource Ballast Water Treatment System
Ballast Water Management System manufactured by:	Resource Ballast Technologies (Pty.) Ltd.
to equipment/assembly drawing No.	Data Sheet 16-00 Data Sheet 16-01
Treated Rated Capacity	100m ³ /hr to 4000m ³ /hr

A copy of this Type Approval Certificate should be carried on board a vessel fitted with this Ballast Water Management System at all times. A reference to the test protocol and a copy of the test results should be available for inspection on board the vessel.

Signed at (place): EAST LONDON. South Africa.

Signature: Captain Peter Kroon

Designation Principal Officer
South African Maritime AuthorityDate of Issue: 18th January 2013Expiry Date: 17th January 2018

System Sizes /Capacities

DN150 – DN600 reactor with a treated rated capacity from 100m³/hr to 4000m³/hr as detailed below. This includes all auxiliary equipment as per the assembly drawing.

Product Number	Flow Rates
DN150	100-200m ³ /hr
DN200	201-400m ³ /hr
DN250	401-600m ³ /hr
DN300	601-1000m ³ /hr
DN350	1001-1200m ³ /hr
DN400	1201-1500m ³ /hr
DN450	1501-2000m ³ /hr
DN500	2001-2500m ³ /hr
DN600	2501-4000m ³ /hr



Filtration:

Filter grade - 40µm

Conditions of Certification:

The Resource Ballast Water Treatment System requires individual approvals for use in hazardous areas.

All Ballast Water treatment systems are to be clearly marked with the suppliers name, type designation and a serial number.

All improvements and/or modifications to the system are to be reported to SAMS and to be submitted with valid test reports demonstrating that the changes do not adversely affect the performance of the system.

Approval Documentation:

- Assessment Letter – Department of Transport dated 27/08/2007
- Approval of Land Based Test Facility – SAMS – dated 25/11/2008
- System Scaling – SAMS – dated 01/06/2009
- Assessment Report – SAMS – dated 16/09/2009
- Marintek Report – Study of Cavitation – MT53 F10-093 530629.00.01 dated 03/05/2010
- P&ID (Drawing OSE77-1-16-03) dated 20/07/2010
- Data Sheets 16-00
- Data Sheets 16-01
- Volume 1 - Resource Operation and Installation Manual dated 19/04/2010
- Volume 2 – Shipboard and land based efficacy test results
- Volume 3 – Health and Safety Standards
- Volume 4 – QAPP and QMP
- Filter test Report – February 2011

APPENDIX 1
Test Results

1.1.1. Ship Board Test Cycle Report, Test Run 1

- Date and time for **ballast water uptake**: Nov 24, 2009, 7:10 - 8:00.
 - Ship position during beginning of uptake: before Gothenburg, Sweden, ca. 55°10N, 18°25E.
 - Distance travelled during uptake was ca. 16 nm.
 - Water depth ca. 40 m.
 - Distance to nearest main land ca. 20 nm.
- Date and time for **ballast water discharge**: Nov 24, 2009, 13:21 - 14:00.
- Holding time of ballast water between uptake and discharge ca. 6 hours.
- Weather conditions during the test: good, minor ship movements.

Table 1. Water quality and number of organisms in uptake and discharge water in ship board test run 1

Parameter	Unit	Uptake water			Discharge water						
		control	before treatment	IMO	control	IMO	treated			aver. #1-#3	IMO
Temperature	°C	11.0	11.0	-	10.9	-	10.9	10.9	10.9	-	-
Salinity	PSU	6.8	6.8	-	8.1	-	8.1	8.1	8.1	-	-
POC *	mg/l	4.4	4.7	-	4.8	-	4.6	4.7	4.6	-	-
TSS *	mg/l	3.44	3.82	-	3.90	-	4.02	3.84	3.86	-	-
Sample vol. >50 µm	Litres	2734	2217	>1000	1746	>1000	1314	1359	1340	1338	>1000
Sample vol. 50-10 µm	Litres	5	5	>1	5	>1	5	5	5	5	>1
Sample vol. bacteria	Litres	1	1	>0.5	1	-	1	1	1	1	>0.5
Organisms >50µm	org./m ³	956	659	>90	473	>10	0.0	0.0	0.0	0.0	<10
Organisms 10-50µm**	org./ml	108.8	110.5	>90	109.2	>10	1.1	1.5	1.7	1.4	<10
<i>Escherichia coli</i>	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<250
Intestinal <i>Enterococci</i>	cfu/100ml	28	34	-	36	-	8	15	5	9.3	<100
<i>Vibrio cholerae</i> ***	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<1

* Analysed at NIOZ, Texel, the Netherlands, ** Analysed on board by Anchor Environmental Consultants, Tokai, South Africa, *** Analysed at IBEN, Bremerhaven, Germany.



1.1.2. Ship Board Test Cycle Report, Test Run 2

- Date and time for ballast water uptake: Nov 25, 2009, 23:50 - 0:25.
 - Ship position during beginning of uptake: after Gothenburg, Sweden, ca. 57°46N, 010°40E.
 - Distance travelled during uptake was ca. 17 nm.
 - Water depth ca. 35-60 m.
 - Distance to nearest main land ca. 20 nm.
- Date and time for ballast water discharge: Nov 26, 2009, 8:38 - 9:19.
- Holding time of ballast water between uptake and discharge ca. 8 hours.
- Weather conditions during the test: gale, up to Bf 9 (major ship movements).

Table 2. Water quality and number of organisms in uptake and discharge water in ship board test run 2

Parameter	Unit	Uptake water			Discharge water						
		control	before treatment	IMO	control	IMO	treated			aver. #1-#3	IMO
Temperature	°C	11.4	11.4	-	12.4	-	12.4	12.4	12.4	-	-
Salinity	PSU	32.7	32.7	-	32.7	-	32.7	32.7	32.7	-	-
POC *	mg/l	7.0	7.0	-	7.7	-	5.4	5.8	7.7	-	-
TSS *	mg/l	14.94	14.28	-	14.00	-	6.38	6.24	12.78	-	-
Sample vol. >50 µm	Litres	2529	1243	>1000	1641	>1000	1103	1137	1164	1135	>1000
Sample vol. 50-10 µm	Litres	5	5	>1	5	>1	5	5	5	5	>1
Sample vol. bacteria	Litres	1	1	>0.5	1	-	1	1	1	1	>0.5
Organisms >50µm	org./m ³	967	893	>90	488	>10	1.8	0.0	0.0	0.6	<10
Organisms 10-50µm**	org./ml	98.7	115.0	>90	123.8	>10	0.9	0.3	0.4	0.5	<10
<i>Escherichia coli</i>	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<250
Intestinal <i>Enterococci</i>	cfu/100ml	58	39	-	43	-	1	12	2	5.0	<100
<i>Vibrio cholerae</i> ***	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<1

* Analysed at NIOZ, Texel, the Netherlands, ** Analysed on board by Anchor Environmental Consultants, Tokai, South Africa, *** Analysed at IBEN, Bremerhaven, Germany.



1.1.3. Ship Board Test Cycle Report. Test Run 3

- Date and time for **ballast water uptake**: July 6, 2010, 22:30 - 23:25.
 - Ship position during beginning of uptake: North Sea, after Zeebrugge, Belgium, ca. 52°06'229"N, 3°04'040"E.
 - Distance travelled during uptake was ca. 20.3 nm.
 - Water depth ca. 20-21 m.
 - Distance to nearest main land ca. 17 nm.
- Date and time for **ballast water discharge**: July 7, 2010, 8:25 – 9:25.
- Holding time of ballast water between uptake and discharge ca. 9 hours.
- Weather conditions during the test: good.

Table 3. Water quality and number of organisms in uptake and discharge water in ship board test run 3

Parameter	Unit	Uptake water			Discharge water						
		control	before treatment	IMO	control	IMO	treated			aver. #1-#3	IMO
							# 1	# 2	# 3		
Temperature	°C	15,1	15,1	-	16,5	-	16,6	16,7	16,7	16,7	-
Salinity	Psu	33,6	33,6	-	33,7	-	33,7	33,7	33,7	33,7	-
POC *	mg/l			-		-					-
TSS *	mg/l			-		-					-
Sample vol. >50 µm	Litres	1080	1069	>1000	1676	>1000	1343	1248	1415	-	>1000
Sample vol. 50-10 µm	Litres	7	7	>1	7	>1	7	7	7	-	>1
Sample vol. bacteria	Litres	1	1	>0.5	1	-	1	1	1	-	>0.5
Organisms >50µm	org./m³	580	1671	>90	74	>10	0.0	0.0	0.0	0.0	<10
Organisms 10-50µm**	org./ml	124.6	149.4	>90	59.1	>10	0.7	0.4	0.1	0.4	<10
<i>Escherichia coli</i>	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<250
Intestinal <i>Enterococci</i>	cfu/100ml	0.0	2.0	-	4.0	-	0.0	0.0	0.0	0.0	<100
<i>Vibrio cholerae</i> ***	cfu/100ml	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	<1

* Analysed at NIOZ, Texel, the Netherlands, ** Analysed on board by Anchor Environmental Consultants, Tokai, South Africa, *** Analysed at IBEN, Bremerhaven, Germany.



Table 4. Result summary land based seawater tests (>32psu)

PARAMETER	UNIT	INFLUENT			5 DAY DISCHARGE									
					TREATED					CONTROL				
		Min	Max	Mean	IMO	Min	Max	Mean	IMO	Min	Max	Mean	IMO	
Organisms > 50 µm	ind/m ³	114815	4366667	1310842	10 ⁵ -10 ⁵	0	7	3.0	<10	1380	15547	8291	>100	
Organisms 10 - 50 µm	ind/ml	1113	1992	1399.1	10 ³ -10 ⁴	0.05	5.00	1.23	<10	103	932	296.5	>100	
<i>Escherichia coli</i>	cfu/100ml	0	55.3	10.9	-	0	0	0	<250	0	7.7	1.5	-	
<i>Vibrio cholerae</i>	cfu/100ml	0	0	0	-	0	0	0	<1	0	0	0	-	
Faecal streptococci	cfu/100ml	1	150	67.7	-	0	0.3	0.2	<100	0	27	12.5	-	
Temperature	°C	14.3	17.1	15.6	-	17.8	22.3	19.34	-	17.7	22.9	19.59	-	
pH		7.4	7.8	7.6	-	7.1	7.5	7.3	-	7.4	7.8	7.6	-	
Salinity	ppt	34.1	34.9	34.4	>32	34.6	35	34.6	-	333.7	35	34.5	-	
Dissolved oxygen	mg/l	7.1	11.2	8.3	-	3.4	7.75	5.1	-	7	14.3	11.3	-	
Total suspended solids	mg/l	2	166.33	61.47	>1	2.67	174	66.73	-	2.3	169	67.66	-	
Total organic carbon	mg/l	1.8	8.1	3.85	>1	1.8	4.4	2.72	-	1.3	3.97	2.65	-	
Dissolved organic carbon	mg/l	0.8 ¹	6.8	2.6	>1	0.6	3.5	2.1	-	0.9	3.5	2.1	-	

¹Seawater test #2 had a slightly low DOC (0.8mg/l) in the influent treated water. All other tests and the mean average remain well above the IMO required standards.

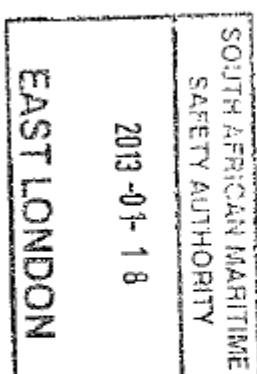


Table 5. Result summary of brackish water land based water tests (< 25 PSU)

PARAMETER	UNIT	INFLUENT				5 DAY DISCHARGE						
		Min	Max	Mean	IMO	TREATED			CONTROL			
					Min	Max	Mean	IMO	Min	Max	Mean	IMO
Organisms > 50 µm	ind/m3	1037	1649	1270	10 ³ -10 ⁴	0.10	1.14	0.38	< 10	130	566	290
Organisms 10 - 50 µm	ind/ml	503703	1322222	977778	10 ⁵ -10 ⁶	0.00	7.67	2.13	< 10	912.4	25667	13495
<i>Escherichia coli</i>	cfu/100ml	6.3	783.3	196.8	-	0	3.7	0.74	<250	0	18.3	5.6
<i>Vibrio cholerae</i>	cfu/100ml	0	0	0	-	0	0	0	< 1	0	0	-
Faecal streptococci	cfu/100ml	12.7	150	85.7	-	0.0	52.7	16.5	<100	0.3	333.3	76.1
Temperature	°C	16.2	20.1	17.3	-	16.2	22.7	18.6	-	15.8	22.6	19
pH		7.2	8.3	7.8	-	4.8	7.5	6.3	-	7.2	7.8	7.4
Salinity	ppt	17.3	25.1	20.8	< 25	17.6	25.4	21.8	-	18.2	25.4	22.5
Dissolved oxygen	mg/l	5.4	10.7	7.7	-	1.5	8	3.3	-	3.6	12.3	7.3
Total suspended solids	mg/l	90.9	136.3	113.6	> 50	91.7	133	110.7	-	90.7	145.3	115.2
Total organic carbon	mg/l	6.3	20.3	10.4	> 5	5.6	9.3	7.2	-	3.2	7.6	5.3
Dissolved organic carbon	mg/l	6	16.9	9.2	> 5	4.2	7.5	6.1	-	2.6	7.4	4.6
Turbidity	NTU	0.1	6.8	2	-	0.1	5.2	1.8	-	0.1	2.2	0.8

SOUTH AFRICAN MARITIME
SAFETY AUTHORITY
2013-01-18
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